

Appl. No. : 09/889,320
Filed : January 10, 2002

AMENDMENTS TO THE CLAIMS

Claims 1-22 (Canceled)

Please amend the following claims:

23. (Currently amended) An all-terrain vehicle comprising:

a frame;

an engine connected to the frame;

at least one front wheel and at least one rear wheel connected to the frame, the at least one rear wheel being driven by the engine, the at least one front wheel comprising an internal gear and rotatably supported on a wheel shaft, the shaft connected to the frame by a front fork, the at least one front wheel further comprising a hub portion rotatable about a wheel axis, the hub defining a recess between an open end and a closed end, the open end of the hub having a circumferential edge that defines a plane generally perpendicular to the wheel axis;

a cover supported relative to the front fork, the cover disposed in the recess between the plane and near the closed end of the hub such that an outermost radial edge of the cover is axially spaced away from the plane defined by the circumferential edge, and such that an outermost axial face of the cover is disposed within the hub;

a sealing arrangement disposed in the recess near the closed end of the hub between the radial edge of the cover and the hub; and

a hydraulic drive system for driving the at least one front wheel comprising

a pump,

a motor supported by the cover, the motor having an output shaft, an output gear fixed for rotation with the output shaft, the output gear driving the internal gear such that rotation of the output gear causes rotation of the at least one front wheel, and

an accumulator in fluid communication with the pump and the motor,

wherein the pump is driven by the engine to create a flow of hydraulic fluid within the hydraulic system, the motor is configured to drive the at least one front wheel in response to the flow of hydraulic fluid, and wherein the accumulator is configured to pressurize the hydraulic drive system.

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24. (Previously presented) The all-terrain vehicle of Claim 23, the hydraulic drive system additionally comprising a supply passage arrangement configured to supply hydraulic fluid from an outlet of the pump to an inlet of the motor, a return passage arrangement configured to return fluid from an outlet of the motor to an inlet of the pump, the accumulator being in fluid communication with the return passage arrangement.

25. (Withdrawn) The all-terrain vehicle of Claim 24, wherein the hydraulic drive system additionally comprises a switching valve and a bypass passage arrangement, the bypass passage arrangement being in fluid communication with the supply passage arrangement and the return passage arrangement, the switching valve operable between at least a rear wheel drive position and an all wheel drive position, the switching valve configured to allow a flow of fluid from the supply passage arrangement to the return passage arrangement through the bypass passage in the rear wheel drive position, the switching valve configured to substantially prevent a flow of fluid from the supply passage arrangement to the return passage arrangement in the all wheel drive position.

26. (Withdrawn) The all-terrain vehicle of Claim 25, wherein the hydraulic drive system additionally comprises a relief valve in fluid communication with the supply passage arrangement and the return passage arrangement, the relief valve being configured to permit hydraulic fluid to pass from the supply passage arrangement to the return passage arrangement when the fluid pressure in the supply passage arrangement exceeds a predetermined threshold fluid pressure.

27. (Withdrawn) The all-terrain vehicle of Claim 25, wherein the hydraulic drive system additionally comprises a check valve in fluid communication with the supply passage arrangement and the return passage arrangement, the check valve being configured to permit hydraulic fluid to pass from the return passage arrangement to the supply passage arrangement when the fluid pressure in the supply passage arrangement is less than the fluid pressure in the return passage arrangement.

28. (Withdrawn) The all-terrain vehicle of Claim 27, wherein the hydraulic drive system additionally comprises a housing and a filter, the housing defining a working oil chamber, the filter being configured to separate impurities from the hydraulic fluid, the filter and the accumulator being disposed within the housing, the switching valve arrangement, a relief valve

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and the check valve being connected to the housing, the relief valve being configured to permit hydraulic fluid to pass from the supply passage arrangement to the return passage arrangement when the fluid pressure in the supply passage arrangement exceeds a predetermined threshold fluid pressure.

29. (Withdrawn) The all-terrain vehicle of Claim 28, wherein the housing comprises a longitudinal center axis, the filter being disposed on a first side of the center axis and the accumulator being disposed on a second side of the center axis, the housing additionally comprising a hydraulic fluid inlet disposed upstream of the filter and a hydraulic fluid outlet being disposed downstream of the filter, the fluid inlet and fluid outlet being disposed on the first side of the center axis.

30. (Previously presented) The all-terrain vehicle of Claim 23, wherein the hydraulic drive system additionally comprises a housing and a filter, at least a portion of the housing enclosing a working oil chamber, the filter being configured to separate impurities from the hydraulic fluid, the filter and the accumulator being disposed within the housing.

31. (Previously presented) The all-terrain vehicle of Claim 30, wherein the filter comprises a first longitudinal axis and the accumulator comprises a second longitudinal axis, the filter being substantially adjacent to the accumulator and the first longitudinal axis being generally parallel to the second longitudinal axis.

32. (Previously presented) The all-terrain vehicle of Claim 31, the vehicle additionally comprising an exhaust pipe having a first end connected to the engine and a second end connected to a muffler, the housing being disposed adjacent to the muffler.

33. (Previously presented) The all-terrain vehicle of Claim 23, wherein the accumulator comprises a flexible bladder at least partially defining a pressurized gas chamber, the bladder having a surface at least partially exposed to hydraulic fluid within the hydraulic drive system.

34. (Previously presented) The all-terrain vehicle of Claim 23, wherein the accumulator comprises a movable piston at least partially defining a pressurized gas chamber, the piston having a surface at least partially exposed to hydraulic fluid within the hydraulic drive system.

35. (Canceled)

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36. (Previously presented) The all-terrain vehicle of Claim 23, wherein the hub portion is generally cylindrical, the internal gear is positioned between the closed end and the cover, the cover comprises a disk, and the sealing arrangement is configured to create a substantial seal between the cover and the hub portion.

37. (Previously presented) The all-terrain vehicle of Claim 23, wherein the sealing arrangement comprises a labyrinth seal formed on a peripheral surface of the cover and a rubber seal member.

38. (Previously presented) The all-terrain vehicle of Claim 37, wherein a substantial portion of the motor is disposed on the opposite side of the cover from the output gear, the cover including an aperture, the output shaft extending through the aperture from the motor to the output gear.

39. (Previously presented) The all-terrain vehicle of Claim 23, wherein the wheel is rotatably supported on the wheel shaft by at least one ball bearing assembly.

40. (Previously presented) The all-terrain vehicle of Claim 23, wherein the wheel is rotatably supported on the wheel shaft by a ball bearing assembly and a needle bearing assembly, the needle bearing assembly being spaced from the ball bearing assembly.

41. (Previously presented) The all-terrain vehicle of Claim 23, additionally comprising means for allowing the at least one front wheel to rotate at a speed which is greater than the speed in which the motor drives the at least one front wheel.

42. (Previously presented) The all-terrain vehicle of Claim 41, wherein the hydraulic drive system is configured to drive the at least one front wheel at a speed which is less than the speed of the at least one rear wheel when substantially no wheel slippage is present.

Claims 43 -54 (Canceled).

55. (Currently amended) An all-terrain vehicle comprising:

a frame;

an engine connected to the frame;

at least one front wheel connected to the frame and rotatably supported on a wheel shaft, the wheel shaft connected to the frame by a front fork, the at least one front wheel

comprising a hub portion rotatable about a wheel axis, the hub defining a recess between an open end and a closed end of the hub, the open end of the hub having a circumferential edge that defines a plane generally perpendicular to the wheel axis;

a cover supported by the wheel shaft, the cover disposed in the recess between the plane and near the closed end of the hub such that an outermost radial edge of the cover is axially spaced away from the plane defined by the circumferential edge, and such that an outermost axial face of the cover is disposed within the hub;

a sealing arrangement disposed in the recess near the closed end of the hub between the radial edge of the cover and the hub;

at least one rear wheel connected to the frame and driven by the engine; and

a hydraulic drive system for driving the at least one front wheel, comprising

a pump,

a motor,

and an accumulator in fluid communication with the pump and the motor,

wherein the engine drives the pump to create a flow of hydraulic fluid within the hydraulic system, the motor drives the at least one front wheel in response to the flow of hydraulic fluid, and the accumulator pressurizes the hydraulic drive system.

56. (Previously presented) The all-terrain vehicle of Claim 55, wherein the at least one front wheel comprises an internal gear.

57. (Previously presented) The all-terrain vehicle of Claim 56, wherein the wheel shaft supports the cover, the cover supports the motor, and the motor connects to an output gear, the output gear driving the internal gear such that rotation of the output gear causes rotation of the at least one front wheel.

58. (Previously presented) The all-terrain vehicle of Claim 55, wherein the cover has a disk disposed within the recess.

59. (Previously presented) The all-terrain vehicle of Claim 55, wherein the sealing arrangement is configured to form a substantial seal between the cover and the hub portion.